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Clean Air for Europe

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The European Medical Students´ Association (EMSA) represents medical students across Europe. We envision a healthy and solidary Europe in which medical students actively promote health. EMSA empowers medical students to advocate health in all policies, excellence in medical research, interprofessional healthcare education and the protection of human rights across Europe.

Problem statement

Water, food, and air are the three fundamental necessities for every human being, and each comes with its own risks. Fortunately, with the discovery of fire, we gained the ability to cook raw ingredients and boil water, making them safer for consumption (Bentsen, 2020). This innovation drastically reduced the risk of foodborne illnesses and waterborne diseases, allowing human civilizations to thrive. But what about air? What about the 14 kg of air we inhale every single day? Unlike food and water, we cannot filter, boil, or cook the air to make it safe for consumption. We cannot physically remove harmful substances before they enter our lungs. So how do we ensure its purity? The answer lies in controlling and reducing air pollution (WHO, 2019).

Air pollution is an invisible yet pervasive threat that significantly impacts both human health and the economy (Murray, 2020; EEA, 2024; WHO, 2024). It consists of a mixture of harmful substances, including fine particulate matter (PM2.5), nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO), and ground-level ozone (O3) (WHO, 2021). Exposure to these pollutants has been linked to a wide range of severe health complications, leading to an alarming number of premature deaths each year. In Europe alone, air pollution caused an estimated 238,000 premature deaths due to exposure to fine particulate matter (EEA, 2022). Another 49,000 deaths were attributed to nitrogen dioxide exposure above WHO guideline levels, while acute ozone exposure was responsible for 24,000 deaths (EEA, 2023).

Beyond mortality rates, air pollution significantly contributes to chronic diseases, reducing quality of life and placing a heavy burden on healthcare systems. Chronic obstructive pulmonary disease (COPD) and type 2 diabetes, for example, are both closely linked to prolonged exposure to polluted air. COPD alone accounted for 175,702 years lived with disability (YLDs) in Europe, while type 2 diabetes contributed to 175,070 YLDs. (EEA, 2023; EEA, 2024). These diseases result in long-term suffering for patients and increased healthcare costs for governments. Additionally, in 2019, 12,253 cases of lower respiratory infections caused by acute ozone exposure were registered across 23 European countries (EEA, 2023). This highlights the direct impact of air pollution on respiratory health, particularly for vulnerable populations such as children, the elderly, and individuals with pre-existing conditions (Xiaorong Yang et al., 2021; Lancet Planet Health, 2022).

The damage caused by air pollution extends far beyond human health; it also affects economic stability, particularly in agriculture and forestry (Fuller, 2024). One of the most harmful pollutants for vegetation is ground-level ozone, which directly damages crops and reduces agricultural productivity (EEA, 2025). In 2019 alone, 1 billion euros in revenue was lost due to ozone-related damage to crops, particularly wheat, representing more than 5% of all wheat produced in Europe (Schucht et al., 2021).

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This not only affects farmers and food production but also contributes to food insecurity and rising prices (EEA, 2024; Juan et al., 2024).

Additionally, the deposition of ammonia and nitrogen oxides into water sources has led to widespread environmental degradation. Approximately 75% of all European ecosystems are now exposed to nitrogen levels far exceeding recommended limits (EEA, 2024; Acid News No.2, 2023). This excess nitrogen causes eutrophication, a process in which bodies of water become enriched with nutrients, leading to excessive algae growth and oxygen depletion. As a result, aquatic life suffers, and entire ecosystems are disrupted, affecting biodiversity and water quality (Wise Marine, 2025).

Air pollution is not just an environmental issue; it is a public health emergency and an economic challenge that demands urgent action(Ricardo, 2024; WHO, 2025). By implementing stricter air quality regulations, reducing industrial emissions, promoting clean energy solutions, and encouraging sustainable agricultural practices, we can protect both human lives and the planet. The fight for clean air is not just about the environment—it is about ensuring a healthier, more sustainable future for all (OECD, 2025; WHO, 2025).

As medical students, we cannot stand by while the planet and one of its most essential components—the air we breathe—is being damaged, possibly beyond repair (Redon-Marin et. al., 2024). As active members of society and future healthcare professionals, we have a dual responsibility. Firstly, as participating members of society, we must advocate for policies that protect air quality by combating pollution and deforestation, two issues intrinsically linked to air quality (Climate Impact Partners, 2024). Secondly, we have a duty to our future patients: to protect their health. Air pollution is closely associated with diseases such as chronic obstructive pulmonary disease (COPD) and type 2 diabetes (Lee et al., 2014; Li et al., 2019). Yet these consequences are not limited to patients, medical students themselves are significantly at risk (Chen et al., 2024; Grantmakers in Health, 2025).

We spend years in training that demands long hours in clinical settings, often in urban hospitals located near high-traffic areas where outdoor pollution levels are elevated. Clinical placements frequently require commuting during peak traffic hours, exposing us to concentrated levels of vehicle emissions. Prolonged exposure to these environments can lead to chronic respiratory irritation, worsened asthma, headaches, fatigue, reduced concentration, and impaired decision-making, which are the factors that directly impact both our learning and our ability to care for patients effectively (Hulya Gul et al., 2011; Alyami et al., 2025; Gregory, 2024). Over time, the cumulative effects may contribute to the early onset of cardiovascular or metabolic diseases, meaning that the very people being trained to protect public health are themselves becoming patients-in-waiting (Gan et al., 2010). Protecting clean air is therefore not only a public health obligation but also a safeguard for the

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wellbeing, professional development, and longevity of the future healthcare workforce (Academy of Science of South Africa et al., 2019).

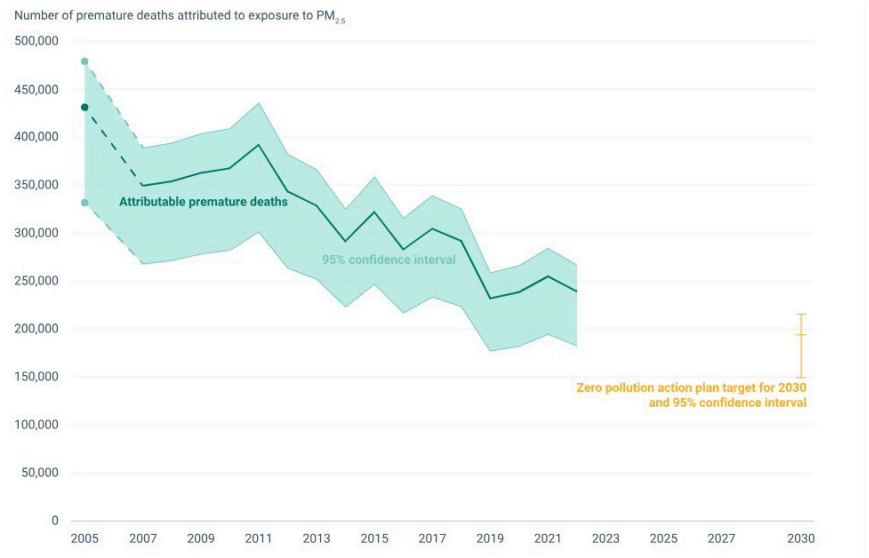

Figure 1 - Premature deaths attributable to exposure to fine particulate matter (PM2.5).

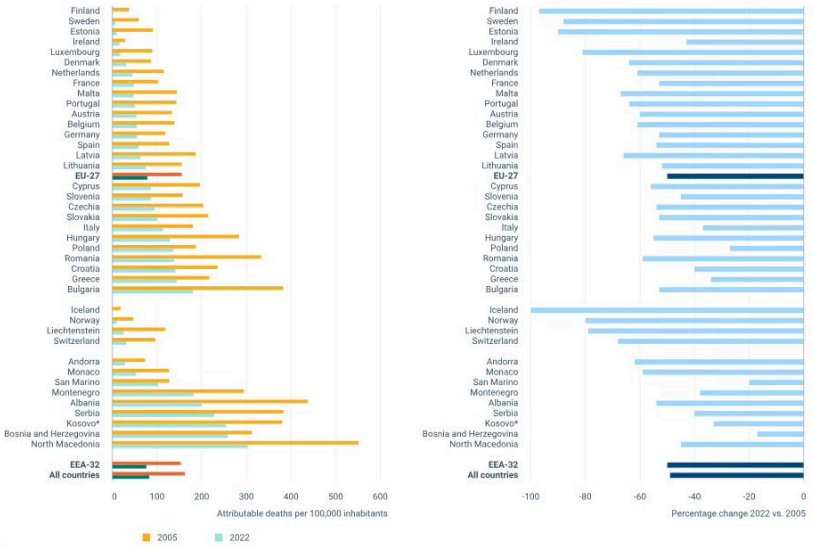

Figure 2 - Premature deaths normalized by population attributable to exposure to PM2.5 at country level in 2005 and 2022 and percentage of change.

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Our view. Aim

EMSA acknowledges air pollution as a critical public health challenge with profound consequences for respiratory health, cardiovascular diseases, and overall well-being. Exposure to pollutants such as fine particulate matter, nitrogen oxides, and ground-level ozone contributes to a significant burden of disease, increasing both mortality and morbidity rates across Europe. Additionally, air pollution exacerbates health inequalities, disproportionately affecting vulnerable populations, including children, the elderly, and individuals with pre-existing conditions.

As future healthcare professionals, EMSA recognizes the necessity of a multidisciplinary approach to air quality improvement. Addressing air pollution requires coordinated efforts between the healthcare sector, policymakers, urban planners, and industry leaders. EMSA is committed to integrating air pollution awareness into medical education, advocating for evidence-based policy reforms, and fostering collaboration between health and environmental sectors. Through research-driven advocacy, capacity-building initiatives, and partnerships with European institutions, EMSA aims to equip medical students with the knowledge and tools to address air pollution as a key determinant of health.

In addition to empowering students, EMSA underscores the importance of patient-centered advocacy in combating air pollution. Medical students have the responsibility of enlightening the patients about the harmful effects of poor air quality on health, promoting preventive measures, and advocating for cleaner environments both at the community and personal levels. By tailoring interventions to high-risk populations' unique demands, like asthma sufferers, pregnant women, and urban residents who are exposed to air pollution, health care providers can play a crucial role in the clinical and public health settings. EMSA supports communication strategies and clinical tools towards patient education and activation so that medical care considers the environment impacting patient health.

Our objective is to promote policy changes that align air quality standards with WHO recommendations, enhance sustainable urban development, and reinforce the role of healthcare professionals in mitigating the health impacts of pollution. By positioning clean air as a fundamental public health priority, EMSA seeks to contribute to a healthier, more sustainable future for all.

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Recommendations

EMSA calls upon European Institutions and healthcare agencies to:

- Enforce stricter air quality standards that align European regulations with the latest WHO guidelines, lowering limits for fine particulate matter, nitrogen dioxide, and ozone,
- Enforce stricter limits on ammonia emissions from fertilizers and livestock waste to prevent fine particulate formation and ecosystem degradation,
- Promote the development and use of less polluting fertilisers,
- Implement penalties for non-compliance while providing financial support for industries and cities transitioning to cleaner alternatives.

EMSA calls upon national governments to:

- Strengthen subsidies and infrastructure for electric vehicles (EVs) to reduce nitrogen dioxide emissions,
- Introduce higher fees for high-emission vehicles while providing exemptions for electric and hydrogen-powered vehicles,
- Expand EV charging infrastructure across all EU countries, ensuring rural areas have access to fast-charging stations,
- Increase subsidies for public transport, including bus and metro systems, to promote affordability and reduce car dependency.

EMSA calls upon European industries and agricultural sectors to:

- Strengthen regulations on industrial emissions, particularly nitrogen oxides and other pollutants from factories,
- Support cleaner production technologies in steel, cement, and chemical industries through EU funding programs,
- Promote sustainable farming practices such as precision agriculture to reduce excess fertilizer use,
- Encourage the development and adoption of new, low-emission fertilizers through government incentives, providing support for farmers and motivating the chemistry industry to invest in cleaner, environmentally friendly solutions,

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- Enforce stricter limits on ammonia emissions from fertilizers and livestock waste to prevent fine particulate formation and ecosystem degradation.

EMSA calls upon European cities to:

- Expand urban green infrastructure, including tree planting, green roofs, and vertical gardens, to filter pollutants and mitigate the heat island effect,
- Expand urban green infrastructure, including tree planting, green roofs, and vertical gardens, to filter pollutants and mitigate the heat island effect,
- Increase funding for urban green spaces to improve air quality and public health.

EMSA calls upon national medical organizations to:

- Raise public awareness about the risks of air pollution and encourage protective measures, especially for vulnerable populations,
- Implement real-time public reporting on air quality indices to inform citizens of health risks,
- Integrate findings on air pollution's long-term health effects into healthcare policies,
- Educate healthcare professionals about the links between air pollution and diseases such as chronic obstructive pulmonary disease (COPD) and type 2 diabetes.

EMSA commits itself to:

- Organize capacity-building activities to equip future healthcare professionals with knowledge and skills to address air pollution,
- Hold meetings, conferences, and workshops under the 'Clean Air for Europe' theme to raise awareness, foster collaboration, and empower medical students to take action,
- Promote sustainable travel by reducing air travel to international EMSA events and encouraging active and low-emission transport options.

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Definitions

EMSA: European Medical Students' Association

WHO: World Health Organization

PM2.5: Particulate Matter < 2.5 micrometers

PM_{10}: Particulate Matter < 10 micrometers (mentioned in the reference section)

NOx: Nitrogen Oxides

SO_2: Sulfur Dioxide

CO: Carbon Monoxide

O_3: Ozone

COPD: Chronic Obstructive Pulmonary Disease

YLDs: Years Lived with Disability

EV: Electric Vehicle

EU: European Union

EEA: European Environment Agency (in the references)

CO_2: Carbon Dioxide (implied under clean energy transition context)

T2DM: Type 2 Diabetes Mellitus (not abbreviated in your text, but commonly known)

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